REMARKS

Status of the Claims

Claims 9-14 and 18-24 have been canceled without prejudice or disclaimer. Claims 1, 5, 7, 15, and 16 have been amended. New claims 27-32 have been added. No new matter has been added. Claims 1-8, 15-17, and 25-32 are pending.

35 U.S.C. §112, second paragraph Rejection

The Office has rejected claim 7, at paragraphs 4 and 5 of the Office Action, under 35 U.S.C. §112, second paragraph, as being indefinite. Applicant has amended claim 7 to correct a typographical error. Applicant respectfully requests withdrawal of the 35 U.S.C. §112, second paragraph rejection.

Claims 1, 5-8, 15, and 25 are Allowable

The Office has rejected claims 1, 5-8, 15, and 25, at paragraphs 6-7 of the Office Action, under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 7,376,144 ("Levi") in view of U.S. Patent No. 5,459,600 ("Davis"), in view of U.S. Patent No. 6,831,981 ("Edasawa"), and further in view of U.S. Patent Publication No. 2004/0264400 ("Lee"). (Applicant respectfully points out that although claim 6 has not been specifically rejected at the first sentence of paragraph 7 of the Office Action, claim 6 is indicated in the Office Action Summary as being rejected and claim 6 is referenced on page 8 of the Office Action.) Applicant respectfully traverses the rejections.

The cited portions of Levi, Davis, Edasawa, and Lee, individually or in combination, do not disclose or suggest the specific combination of claim 1. For example, the cited portions of Levi do not disclose or suggest communicating a combined asynchronous transfer mode/internet protocol (ATM/IP) signal via an optical medium, where the combined ATM/IP signal includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, and where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1. Levi describes means for supplying a customer with voice and data services over a single line without having to convert all services to a single service type at a

transmitting end and then having to convert them back to their original service type at the receiving end. *See* Levi, col. 3, lines 2-10. In Levi, each frame can be a standard length and can carry IP data, ATM data, and voice data. *See* Levi, Fig. 1, and col. 5, lines 14-20. The cited portions of Levi do not disclose or suggest modulating a signal with two distinct sets of data by applying two different modulation techniques to a signal, each modulation technique encoding the signal with a distinct data set.

Davis describes a system including a first modulator M_F situated in a path 24F and a second modulator M_S situated in a path 24S. *See* Davis, Fig. 2. Each of the modulators 26F and 26S modulates an unmodulated source of radiant energy 18 that is input to each of paths 24S and 24F via a splitter 22. *See* Davis, col. 6, lines 49-50, and Fig. 2. In Davis, Modulator 26F applies a first telecommunication signal to a first portion of the radiant energy (unmodulated) passing through optical path 24F. *See* Davis, col. 6, lines 60-65. (Emphasis added). Modulator 26SF applies a second telecommunication signal to a second portion of the radiant energy (unmodulated) passing through optical path 24S. *See* Davis, col. 6, line 65 – col. 7, line 3. (Emphasis added). The cited portions of Davis do not disclose or suggest modulating a signal with two distinct sets of data by applying two different modulation techniques to a signal, each modulation technique encoding the signal with a distinct data set. The cited portions of Davis do not disclose or suggest a combined ATM/IP signal that includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, and where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1.

Further, the cited portions of Edasawa do not disclose or suggest this element of claim 1. Edasawa describes an information transceiver system for transmitting and receiving specific information including a transmission device that transmits a key message in which a specific information cipher key is ciphered with a usual key. *See* Edasawa, Abstract. In Edasawa, a cipher message generator transmits a ciphered message in which specific information is ciphered with a specific information cipher key to a particular information reception device and also transmits a key message to unlock the specific information, the key message ciphered with a usual key used with the particular information device. *See* Edasawa, col. 4, lines 10-18. (Emphasis added). The cited portions of Edawawa do not disclose or suggest communicating a

combined asynchronous transfer mode/internet protocol (ATM/IP) signal via an optical medium, where the combined ATM/IP signal includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, and where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1.

Further, the cited portions of Lee do not disclose or suggest this element of claim 1. Lee describes an ethernet passive optical network including an optical line terminal to modulate data into frequencies assigned to each optical network terminal, coupling a broadcasting image signal with a communication signal, and transmitting the coupled signal. *See* Lee, Abstract. In Lee, digitally modulated broadcasting/image signals are combined into one signal and then the combined signal is optically modulated into an optical signal having a wavelength λ_B. *See* Lee, paragraph [0035]. In parallel with the formulation of the optically converted broadcasting/image signal λ_B, communication data transmitted from an upper IP network is processed and optically modulated into an optical signal having a wavelength of λ_{DOWN}. *See* Lee, paragraph [0036]. The modulated optical signal λ_{DOWN} is coupled with the optically converted signal λ_B and the coupled signals are transmitted to the ONTs. *See* Lee, paragraph [0036]. Thus, in Lee, two modulated optical signals, λ_B and λ_{DOWN}, are coupled and then are transmitted. The cited portions of Lee do not disclose or suggest modulating a signal with two distinct sets of data by applying two different modulation techniques to a signal, each modulation technique encoding the signal with a distinct data set. The cited portions of Lee do not disclose or suggest communicating a combined asynchronous transfer mode/internet protocol (ATM/IP) signal via an optical medium, where the combined ATM/IP signal includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, and where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1.

Therefore, the cited portions of Levi, Davis, Edasawa, and Lee, separately or in combination, fail to disclose or suggest each and every element of claim 1. Hence, claim 1 is allowable. Claims 5-8 and 25 depend from claim 1 and are allowable at least by virtue of their dependence from claim 1.

The cited portions of Levi, Davis, Edasawa, and Lee, individually or in combination, do not disclose or suggest the specific combination of claim 15. For example, the cited portions of Levi do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. Levi describes means for supplying a customer with voice and data services over a single line without having to convert all services to a single service type at a transmitting end and then having to convert them back to their original service type at the receiving end. *See* Levi, col. 3, lines 2-10. In Levi, each frame can be a standard length and can carry IP data, ATM data, and voice data. *See* Levi, Fig. 1, and col. 5, lines 14-20. The cited portions of Levi do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15.

Further, the cited portions of Davis do not disclose or suggest this element of claim 15. In Davis, each of modulators 26S and 26F modulates an unmodulated source of radiant energy 18 that is input to a corresponding path 24S and 24F via a splitter 22. *See* Davis, col. 6, lines 49-50, and Fig. 2. In Davis, modulator 26F applies a first telecommunication signal to a first portion of the radiant (unmodulated) energy passing through optical path 24F. *See* Davis, col. 6, lines 60-65. (Emphasis added). Modulator 26S applies a second telecommunication signal to a second portion of the radiant (unmodulated) energy entering optical path 24S. *See* Davis, col. 6, line 65 – col. 7, line 3. (Emphasis added). The cited portions of Davis do not disclose or suggest a phase modulator that modulates a signal with IP data, and where the signal has been modulated with ATM data via pulse amplitude modulation.

Further, the cited portions of Edasawa do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. In Edasawa, a cipher message generator transmits a

ciphered message in which specific information is ciphered with a specific information cipher key to a particular information reception device and also transmits a key message to unlock the specific information, the key message ciphered with a usual key used with the particular information device. *See* Edasawa, col. 4, lines 10-18. (Emphasis added). The cited portions of Edawawa do not disclose or suggest a phase modulator that modulates a signal with IP data, where the signal has been modulated with ATM data via pulse amplitude modulation.

Further, the cited portions of Lee do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. Lee describes an ethernet passive optical network including an optical line terminal to modulate data into frequencies assigned to each optical network terminal, coupling a broadcasting image signal with a communication signal, and transmitting the coupled signal. *See* Lee, Abstract. In Lee, digitally modulated broadcasting/image signals are combined into one signal and then the combined signal is optically modulated into an optical signal having a wavelength λ_B. *See* Lee, paragraph [0035]. In parallel with the formulation of the optically converted broadcasting/image signal λ_B, communication data transmitted from an upper IP network is processed and optically modulated into an optical signal having a wavelength of λ_{DOWN}. *See* Lee, paragraph [0036]. The modulated optical signal λ_{DOWN} is coupled with the optically converted signal λ_B and the coupled signals are transmitted to the ONTs. *See* Lee, paragraph [0036]. Thus, in Lee, two modulated optical signals, λ_B and λ_{DOWN}, are coupled and then are transmitted. The cited portions of Lee do not disclose or suggest a phase modulator that modulates a signal with IP data, where the signal has been modulated with ATM data via pulse amplitude modulation. The cited portions of Lee do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15.

Therefore, the cited portions of Levi, Davis, Edasawa, and Lee, individually or in combination, fail to disclose or suggest each and every element of claim 15. Hence, claim 15 is allowable.

Claims 2 and 16 are Allowable

The Office has rejected claims 2 and 16, at paragraph 8 of the Office Action, under 35 U.S.C. §103(a), as being unpatentable over Levi in view of Davis, Edasawa, Lee, and further in view of U.S. Patent No. 6,479,978 ("Aliahmad"). Applicant respectfully traverses the rejections.

As explained above, the cited portions of Levi, Davis, Edasawa, and Lee, separately or in combination, do not disclose or suggest each and every element of claim 1, from which claim 2 depends. The cited portions of Aliahmad do not disclose or suggest the elements of claim 1 that are not disclosed or suggested by the cited portions of Levi, Davis, Edasawa, and Lee. For example, the cited portions of Aliahmad do not disclose or suggest communicating a combined asynchronous transfer mode/internet protocol (ATM/IP) signal via an optical medium, where the combined ATM/IP signal includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1. Aliahmad describes a phase difference to duty-cycle circuit that converts a phase shifted signal and a reference signal into a single signal having a duty cycle that is a function of the phase difference between the two signals. *See* Aliahmad, Abstract. The cited portions of Aliahmad fail to disclose or suggest communicating a combined asynchronous transfer mode/internet protocol (ATM/IP) signal via an optical medium, where the combined ATM/IP signal includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1. Hence, claim 1 is allowable over the cited portions of Levi, Davis, Edasawa, Lee, and Aliahmad, and claim 2 is allowable at least by virtue of its dependence from claim 1.

As explained above, the cited portions of Levi, Davis, Edasawa, and Lee, separately or in combination, do not disclose or suggest each and every element of claim 15, from which claim

16 depends. The cited portions of Aliahmad do not disclose or suggest the elements of claim 15 that are not disclosed or suggested by the cited portions of Levi, Davis, Edasawa, and Lee. For example, the cited portions of Aliahmad do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. Therefore, the cited portions of Levi, Davis, Edasawa, Lee, and Aliahmad, separately or in combination, fail to disclose each and every element of claim 15. Hence, claim 15 is allowable over the cited portions of Levi, Davis, Edasawa, Lee, and Aliahmad, and claim 16 is allowable at least by virtue of its dependence from claim 15.

Claims 3, 4, and 17 are Allowable

The Office has rejected claims 3, 4, and 17, at paragraph 9 of the Office Action, under 35 U.S.C. §103(a), as being unpatentable over Levi, Davis, Edasawa, Lee, and U.S. Patent No. 6,608,874 ("Beidas"). Applicant respectfully traverses the rejections.

As explained above, the cited portions of Levi, Davis, Edasawa, and Lee, separately or in combination, do not disclose or suggest each and every element of claim 1, from which claims 3 and 4 depend. The cited portions of Beidas do not disclose or suggest the elements of claim 1 that are not disclosed or suggested by the cited portions of Levi, Davis, Edasawa, and Lee. For example, the cited portions of Beidas fail to disclose or suggest communicating a combined asynchronous transfer mode/internet protocol (ATM/IP) signal via an optical medium, where the combined ATM/IP signal includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1. Beidas describes a modulation method employing transmission of a modulation signal including simultaneous interfering pulses to a receiver that is capable of demodulating the modulated signal and compensating for the interference to recover the transmitted pulses and underlying data signals. *See* Beidas, col. 2, lines 35-41. The cited portions of Beidas fail to disclose or suggest modulating a signal with two distinct sets of data by applying two different modulation techniques to a signal (pulse amplitude modulation and phase modulation), each modulation technique encoding the signal with a distinct data set. The cited

portions of Beidas do not disclose or suggest communicating a combined asynchronous transfer mode/internet protocol (ATM/IP) signal via an optical medium, where the combined ATM/IP signal includes an asynchronous transfer mode (ATM) signal including a sequence of pulses that are pulse amplitude modulated according to first data that is distinct from second data, where the ATM signal is phase modulated with the second data that is based on an internet protocol (IP) signal, as in claim 1. Therefore, the cited portions of Levi, Davis, Edasawa, Lee, and Beidas, separately or in combination, do not disclose or suggest each and every element of claim 1. Hence, claim 1 is allowable over the cited portions of Levi, Davis, Edasawa, Lee, and Beidas, and claims 3 and 4 are allowable at least by virtue of their dependence from claim 1.

As explained above, the cited portions of Levi, Davis, Edasawa, and Lee, separately or in combination, do not disclose or suggest each and every element of claim 15, from which claim 17 depends. The cited portions of Beidas do not disclose or suggest the elements of claim 15 that are not disclosed or suggested by the cited portions of Levi, Davis, Edasawa, and Lee. For example, the cited portions of Beidas fail to disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. Beidas describes a modulator that modulates at least two data signals and includes means for developing for each data signal a pulse of a predetermined shape and combining means for combining the pulses and the data signals to form a combined signal where at least two signal components (that are based on the pulses and on the digital values of the data signals) of the combined signal overlap in time and in frequency. *See* Beidas, col. 2, lines 47-56. The cited portions of Beidas fail to disclose or suggest a modulator that phase modulates a signal that has been modulated using pulse amplitude modulation, each modulation technique encoding the signal with a distinct data set. The cited portions of Beidas do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. Therefore, the cited portions of Levi, Davis, Edasawa, Lee, and Beidas, separately or in combination, do not disclose or suggest each and every element of claim 15. Hence, claim 15 is allowable over the cited

portions of Levi, Davis, Edasawa, Lee, and Beidas, and claim 17 is allowable at least by virtue of its dependence from claim 15.

Claim 26 is Allowable

The Office has rejected claim 26, at paragraph 10 of the Office Action, under 35 U.S.C. §103(a), as being unpatentable over Levi, Davis, Edasawa, Lee, and U.S. Patent No. 6,940,859 ("Czerwiec"). Applicant respectfully traverses the rejection.

As explained above, the cited portions of Levi, Davis, Edasawa, and Lee, separately or in combination, do not disclose or suggest each and every element of claim 15, from which claim 26 depends. The cited portions of Czerwiec do not disclose or suggest the elements of claim 15 that are not disclosed or suggested by the cited portions of Levi, Davis, Edasawa, and Lee. For example, the cited portions of Czerwiec fail to disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. Czerwiec describes modulating a signal according to a carrierless amplitude and phased modulation technique. *See* Czerwiec, col. 28, pages 28-33. The cited portions of Czerwiec do not disclose or suggest a modulator that phase modulates a signal that has been modulated using pulse amplitude modulation, each modulation technique encoding the signal with a distinct data set. The cited portions of Czerwiec do not disclose or suggest an optical line terminal (OLT) including a phase modulator configured to phase modulate an asynchronous transfer mode (ATM) signal based on an IP signal to produce a combined asynchronous transfer mode/internet protocol (ATM/IP) signal, where the ATM signal is pulse amplitude modulated with an ATM data stream, as in claim 15. Therefore, the cited portions of Levi, Davis, Edasawa, Lee, and Czerwiec, separately or in combination, do not disclose or suggest each and every element of claim 15. Hence, claim 15 is allowable, and claim 26 is allowable at least by virtue of its dependence from claim 15.

Claims 27-32 are Allowable

New claims 27-32 have been added and are supported by the Specification. No new matter has been added. Claim 27 depends from claim 15 and is allowable at least by virtue of its

dependence from claim 15. Claim 28 depends from claim 1 and is allowable at least by virtue of its dependence from claim 1. Applicant submits that claims 29-32 are allowable.

CONCLUSION

Applicant has pointed out specific features of the claims not disclosed, suggested, or rendered obvious by the cited portions of the references applied in the Office Action. Accordingly, Applicant respectfully requests reconsideration and withdrawal of each of the rejections, as well as an indication of the allowability of each of the pending claims.

Any changes to the claims in this amendment, which have not been specifically noted to overcome a rejection based upon the cited art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate allowance of this application.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account Number 50-2469.

Respectfully submitted,

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Date

Jason L. Moore, Reg. No. 52,046
Attorney for Applicant
Toler Law Group, Intellectual Properties
8500 Bluffstone Cove, Suite A201
Austin, Texas 78759
(512) 327-5515 (phone)
(512) 327-5575 (fax)